

**Development and Application of Infrastructure for a
Model Trading Registry and Agricultural Participation
in the Kalamazoo River Watershed, Michigan**

(HUC-8 Code 04050003)

Submitted by:

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ABSTRACT

This project will build on Kalamazoo River and Michigan-based trading experiences to develop, test and implement “model” tools and infrastructure necessary to enable functioning water quality trading markets. Funding will support agricultural BMPs to achieve load allocation goals in an EPA-approved Kalamazoo River phosphorus TMDL. Reductions will be used to test marketplace instruments and apply agricultural participation and credit banking schemes. Trading approaches will be instituted that allow for voluntary participation, insulate producers from NPDES permit liability and can be delivered consistently through traditional programs. Transferable marketplace and regulatory instruments developed here will: facilitate access to trading programs; minimize transaction and administrative costs; connect buyers and sellers; facilitate decision-making, and; quantify and track reductions. Tools will be integrated with existing regulatory programs to foster active markets. The Gun Lake Tribe will lead this effort. Outreach will be to Michigan, other states, tribes and EPA.

Introduction

Known for its decades long role as a receptacle of waste for the “Paper Capital of the World,” the Kalamazoo River has a storied history. From a once prized small mouth fishery, to an oxygen starved, milky-white receiving stream for mill waste, the 160-mile long river now meets most ambient water quality standards. Remaining nutrient enrichment challenges have emboldened stakeholders to pursue unique solutions including water quality trading and innovative permitting approaches. This project builds on these efforts to institutionalize market-based innovations at the local level and revolutionize these at the state, tribal and national levels. The Match-E-Be-Nash-She-Wish Band of Pottawatomi (a.k.a. the Gun Lake Tribe) is leading this initiative on behalf of a watershed-wide group addressing eutrophication issues through a phosphorus TMDL that calls for trading.

Watershed Description: The 2,020 mi² Kalamazoo River watershed in southwest Lower Michigan (Figure 1, Attachment A) supports a population of nearly 500,000 and is comprised of 41% forest and rural open areas, 45% agriculture, 7% urban and 7% open water and wetlands. The Gun Lake Tribe has current and ceded lands within the watershed. Significant historical, cultural and spiritual interests link the tribe to this basin. The current City of Kalamazoo was of the center of the tribe’s dedicated homelands until the mid-1800s.

Threats & Impairments: Eighty miles of the river remain plagued with PCB-laden sediments and fish consumption advisories from the paper mill legacy. Other select areas are impaired by non-point source runoff, nutrient enrichment and habitat loss. Lake Allegan, a 1,500-acre impoundment situated twenty-one miles upstream of Lake Michigan in the lower reaches of the watershed, suffers from phosphorus over-enrichment resulting in frequent algal blooms, low oxygen levels, poor water clarity and a carp-dominated fishery.

Watershed Plan/Goals: A Remedial and Preventive Action Plan (RAP) for the Kalamazoo River Area of Concern largely targets Superfund issues associated with PCBs. An EPA-approved phosphorus TMDL addresses point sources (representing 35% of the load) and non-point sources (65%) (see www.kalamazooriver.net). Both the RAP and TMDL target a broad array of water quality improvement and protection goals. Sustainable short and long-term goals include sediment and nutrient load reductions through traditional and innovative approaches. The TMDL dictates a 43% non-point source reduction and a 23% point source reduction (only for July-September). A Cooperative Agreement commits point sources to a collective waste load allocation plus assistance for non-point sources. Over 150 watershed-wide stakeholders participated in TMDL development since 1998, culminating in a flexible implementation (load reduction) plan that identifies sources, reduction targets, the strategy and timeline to achieve goals. Innovative measures include water quality trading, point and non-point source tracking and cooperative agreements in lieu of individual waste load allocations. Lacking the necessary tools, neither trading nor non-point source tracking have been initiated.

Watershed Activities: The TMDL builds upon subwatershed management planning projects, Phase II Stormwater Permits, and dozens of locally-led efforts. An Implementation Committee (IC) including the Gun Lake Tribe, guides TMDL efforts. A new agricultural “Cooperative Alliance for Responsible Environmental Stewardship” (CARES) focuses on progressive conservation planning, water quality monitoring and elimination of surface water discharges through BMPs, education, technical assistance and recognition programs. The watershed also has supported an EPA-funded Water Quality Trading Pilot Study that formed the framework for Michigan’s trading rules and EPA Trading Policy, and spawned the Environmental Trading Network (ETN), the only national clearinghouse for trading. The current TMDL Cooperative Agreement serves as a forerunner to watershed-based permits.

Description of Proposed Study Projects

States, tribes and watershed organizations across the U.S. are contemplating or actively pursuing development of water quality trading programs to protect or improve the nations' waters. Many are evaluating trading strategies to: a) provide needed flexibility and program transparency for highly variable watersheds and water quality conditions, and; 2) minimize the cost of achieving water quality goals through TMDLs. Despite progress with demonstration projects, the lack of marketplace and regulatory tracking tools impedes successful trading program implementation, performance and sustainability. A functioning and robust water quality trading market that has these tools can provide a range of environmental and economic benefits.

Watershed Health Expectations: Direct and immediate water quality benefits are anticipated with agricultural BMP installations proposed in this project. Current estimates suggest an annual average phosphorus load of approximately 51,000 pounds/year stemming from agriculture. A 43% reduction specified for all non-point sources equates to a 21,775 pound reduction goal for agriculture. Based on previous pilot trading efforts in the watershed, costs per pound of phosphorus reduction range from \$2-\$10 for agricultural BMPs. Project support for new BMPs is therefore expected to yield significant and quantifiable reductions that will meet and surpass agriculture's respective load allocation target. Improvements will be directly tracked and credited towards the Load Allocation. Other environmental benefits are also expected with BMPs including expanded wildlife and wetland habitat, carbon sequestration and improved receiving streams (related to reduced sediment loads). The additional value of coupling these reductions with trading is reflected by the net environmental benefits expected with each credit exchange under Michigan rules. For point source/point source trading, there is a 10% retirement with the required 1.1:1 trading ratio; a 50% retirement at the 2:1 point source/non-point trading ratio. New market opportunities may also be discovered with a functioning water quality trading

program where a registry can also identify proposed projects potentially sought for possible Supplemental Environmental Projects (SEPs), or restoration projects for a Natural Resource Damages Assessment. Other environmental commodities may also be generated through trading projects and eligible for sale in other established markets.

Project Description:

We propose two major project tasks: 1) develop a “model” trading infrastructure, and; 2) develop a “model” trading framework for successful agricultural participation. Both will be tested and verified with real reductions through agricultural participation and other partners. With the following task descriptions, we provide as appropriate, scheduling milestones **[in bold]** assuming twelve quarters over three years. EPA support is requested for: infrastructure (\$295,000), agricultural participation (\$525,000), monitoring/evaluation (\$381,715) and education/outreach (\$95,000). These correspond to the total request of \$1,296,715. (Our partner match total is \$1,868,755.)

1. Trading Infrastructure: The project will develop and apply innovative mechanisms and infrastructure to implement watershed-based nutrient trading. Tested in the Kalamazoo River watershed, this will include: A) marketplace evaluation tools, and; B) a model trading registry (electronic board of trade).

A. Marketplace Tools - The first-of-its-kind, prototype marketplace tool, “NutrientNet” (www.nutrientnet.org), will be provided by the World Resources Institute (WRI) for updating and use in this project. While it is being examined in other test applications around the country, NutrientNet’s original development was partly based in the Kalamazoo River watershed. Using a GIS platform, users can identify and characterize their operations, estimate baselines and mitigated nutrient loadings, and review expected costs and potential number of credits available to buy or sell. This type of tool allows for lower transaction costs by easily identifying market

participants, standardizing nutrient credit estimation to establish credibility and indexing credit values. For this NutrientNet application, we will: a) develop interactive GIS mapping for the Kalamazoo River watershed [**quarters 1-3**]; b) add up to ten additional agricultural BMPs to user menus [**2-4**]; c) integrate urban stormwater load computational methodologies specified in Michigan rules (to welcome urban opportunities for buying and selling by committed partners) [**2-4**], and; d) add up to ten urban BMPs to allow for urban stormwater decision-making and credit estimation [**4-8**]. Additions will be determined through an iterative process with watershed participants representing agriculture and municipal interests. These will be verified with project data or other local sources. NutrientNet is provided to this project as an in-kind commitment; it will remain available as the marketplace tool for the watershed after this project is completed.

B. Trading Registry – Regulatory agencies and the public must be able to “see” how and where credits are being generated and used for successful watershed-based trading. The project will develop and demonstrate the application of a model electronic board of trade based on Michigan’s trading rules. This will consider electronic reporting (notices) for the generation and use of credits, informational requirements, certifications for truth and accuracy, and password and security provisions. It will be designed for Internet access to reduce administrative and transactions costs, and provide real time information on trades. Agricultural reductions and other urban stormwater partner applications will be used to test the registry design through NutrientNet linkages. The goal will be a fully functional registry model based on Kalamazoo River applications. It will be offered to Michigan for adoption and made available to other states, tribes and EPA. Registry development will involve a series of iterative steps including: conceptual development [**quarters 1-2**], initial framework design [**3-5**], verification with project results [**6-8**] and final design [**8-10**].

2) Agriculture, Trading and TMDLs: New water quality programs and TMDLs are driving agriculture to ever increasing requirements to better manage their operations. Market-based incentives such as water quality trading will help address farmers' obligations through their own voluntary efforts. Such efforts, managed through private contracts or credit "banks" and not permits, generate market commodities (a familiar concept to producers), reduce costs, and provide measurable improvements to operations and the environment. Model programs for this type of agricultural participation will be developed, tested and institutionalized in this project. These will embody traditional assistance by service agencies and Conservation Districts. The approach will identify and establish the mechanisms and infrastructure necessary for establishing a water quality credit "bank" or "aggregator" through existing or hybrid agricultural organizations or cooperatives.

Several agricultural projects in the Kalamazoo River watershed have attempted to address water quality issues, but each has struggled to successfully engage and sustain farmer participation. With its start in 2003, up to 180 farmers in the Kalamazoo River watershed are expected to participate in CARES through the Michigan Agriculture Environmental Assurance Program (MAEAP) Progressive Planning approach by 2008. This target group comprises livestock producers and crop farmers contiguous to surface waters in the watershed. Trading is one of the mechanisms being pursued to support farmer participation in TMDLs.

This Watershed Initiative project will fund installation of voluntary conservation practices (BMPs) for producers who seek certification through CARES [**quarters 3-9**]. Candidates must be able to demonstrate a 25% cost share. Technical support will come through Conservation Districts that will receive project funding for Technical Service Providers [**quarters 1-12**].

Goals of this project task include: development [**1-4**] and establishment of a successful, transferable framework for agricultural participation, credit banking, education, and

implementation of conservation practices for trading and TMDLs [5-12]; integration of research linking phosphorus losses from agriculture and other non-point sources to surface water into trading tools [6-12], and; identification of financial mechanisms to sustain local agency support [8-12].

Monitoring & Evaluation:

One of the inherent benefits of trading is the quantification requirement to ascertain that loadings are real and surplus. Loading estimation tools and standard BMP efficiency assumptions typically used in trading applications will be verified with intensive field testing at selected sites. This will include traditional sampling approaches for phosphorus and suspended solids along with state-of-the-art phosphate field analyzers in partnership with YSI, Inc. Rigorous pre-/post-BMP water quality monitoring protocols will be developed and implemented that provide baseline data and best address the challenges with short-term documentation of water quality improvements from agricultural BMPs [quarters 1-11]. All such BMPs will be tracked exclusively with NutrientNet [6-11]. Monitoring and modeling data from urban BMP projects provided from partner projects would be similarly tracked [6-11]. Other environmental commodities that may also be generated through trading projects will be estimated and documented separately from NutrientNet [8-12].

Agricultural credits will be validated with field monitoring; Technical Service Providers and CARES will verify confirmation of practice installation [6-12]. The prototype registry will be Internet accessible [5] to provide transparency and public access to registered credits. Possible trades would be conducted electronically via the market infrastructure being developed for this project such that regulatory oversight can be conducted by MDEQ as specified by Michigan rules [8-12].

Costs and BMP effectiveness from monitoring will be used to update watershed specific applications in NutrientNet. This tool will track measurable success in terms of pounds of phosphorus reduction. Real-time tracking via the Internet prototype registry will provide for public recognition of successes. The veracity of NutrientNet for TMDL/trading applications will be evaluated. Discrepancies between load estimations and monitoring data will be characterized [6-12] and any necessary adjustments in trading ratios, baselines or TMDL Margin of Safety will be adapted in final tool development [10-12]. Other measures of success will be the posting of credits by others not receiving funds through this project, adoption of trading tools by Michigan, and requests for these products by other states and tribes.

Quarterly team meetings of project partners and TMDL Implementation Committee representatives will be used to track progress, discuss findings and needs, provide approvals and make adjustments as needed. Annual reports documenting milestones and accomplishments will be prepared and posted electronically.

Consistency with Other Programs: Michigan is the first state to develop rules for a voluntary, statewide program providing clear legal authority for trading. These rules are consistent with EPA Trading Policy. They identify trading requirements within the context of NPDES permits, watershed plans and TMDLs. This Kalamazoo River application is an ideal test setting given: Michigan Department of Environmental Quality (MDEQ) is a signatory to the TMDL Cooperative Agreement that serves as a watershed-based permit identifying trading as an option; the TMDL Implementation Plan calls for trading consistent with Michigan's Rules; NPDES permits include trading provisions; point sources are identifying growth needs and will rely on trading; local and state agriculture supports the idea of market-based tools, and; trading infrastructure is necessary to enable such trades. The project will advance EPA Trading Policy implementation at the watershed level through the direct application and development of trading

instruments and markets in an actual TMDL setting. These address nationally important issues associated with implementing trading integrated with NPDES programs, permits and pending nutrient criteria for states and tribes.

Project Management

Recognizing that we “borrow the future from our children,” the Gun Lake Tribe initiates this proposal looking forward to a healthier, more dynamic watershed that will serve as a role model for accomplishment and implementation for Michigan, Native peoples and indeed, all Americans. No other tribe in EPA Region V has the expertise, knowledge, partner affiliations or interest in trading concepts other than the Gun Lake Tribe. Mr. Michael Tenenbaum, Tribal Environmental Coordinator, will lead the project. He was intimately involved with the Kalamazoo Trading Pilot Project, Kalamazoo River TMDL implementation plan development and other trading efforts in the private sector. Past affiliations included positions in environmental consulting and solid waste management. With his 30 years of experience and formal training as a biologist, he has managed dozens of environmental projects totaling more than \$4.5M. The tribe has managed \$1.75M in federal grants since 1999. The Kalamazoo-based consultant, Kieser & Associates (K&A), brings expertise in water quality monitoring, modeling and TMDL experience. With nationally recognized trading expertise, Mark Kieser (also the Acting ETN Chair) and David J. Batchelor (author of Michigan’s trading rules and EPA Trading Policy), will lead K&A efforts. Mr. Paul Faeth, Executive Vice President of the non-profit, WRI in Washington, D.C., and his staff will also bring national trading expertise to the project.

The Tribe will administer the project, be responsible for coordination of partners and lead all elements of outreach and education (working with the ETN and other partners) (\$161,715). K&A will lead all technical efforts on monitoring, quantification, coordination of tool development and verification and trading/TMDL program applications (\$395,000). WRI will be responsible for all

aspects of NutrientNet updates as well as programming for the electronic registry (\$175,000). Four active Conservation District partners (working with CARES) will receive subgrants for \$150,000 to support Technical Service Providers. The \$300,000 for agricultural BMPs will be distributed by the Tribe to producers selected by CARES and approved by the TMDL Implementation Committee. MDEQ staff at the local and state level will be supported through this grant for direct participation (\$100,000). This will optimize development of trading infrastructure such that issues, needs and public comment can be provided during the three-year project as opposed to after such tools are offered to the state at project end. ETN support (\$15,000) will foster national dialog, outreach and availability of register and banking models. Attachment B provides letters of commitment from these and other organizations contributing in-kind and matching funds; Attachment C includes letters of project support.

Outreach, Education and Transferability

The TMDL Implementation Committee, representing nearly 75 different watershed entities, will provide community-based direction and local outreach throughout this project. Agricultural participation will be led by participants of the CARES initiative with support from Conservation Districts, Michigan Farm Bureau and USDA-NRCS. The project will solicit input from EPA Region V. Other input will come from Quarterly meetings of both the Great Lakes Regional Tribal Operations Committee (RTOC; 35 tribes) and the Michigan Tribal Environmental Group (MTEG; 14 tribes), and nationally via the ETN conference calls. The ETN communicates regularly with nearly 100 monthly conference call participants. Reports, the electronic trading registry and agricultural trading framework will be made available via the ETN website (www.envtn.org) to states, tribes and EPA. Project efforts will be presented at up to two national meetings per year.

Table 1. BUDGET INFORMATION - EPA Watershed Initiative Grant Program¹

“Development and Application of Infrastructure for a Model Trading Registry and
Agricultural Participation in the Kalamazoo River Watershed, Michigan”

SECTION A - BUDGET SUMMARY					
Watershed Project, Activity or Work Plan Element			Federal	Non-Federal	Total
1.Infrastructure (NutrientNet and Registry)			\$ 295,000	\$ 1,000,000	\$1,295,000
2.Agricultural BMP Implementation Activities			525,000	626,010	1,151,010
3.Monitoring/Evaluation/Meetings/Reports			381,715	224,745	606,460
4.Education & Outreach			95,000	18,000	113,000
Totals			\$1,296,715	\$1,868,775	\$3,165,490
SECTION B - BUDGET CATEGORIES					
	Watershed Project, Activity or Work Plan Element				Total
Budget Categories	(1)	(2)	(3)	(4)	
a. Personnel (tribe)	\$ 17,400	\$ 17,400	\$ 26,100	\$ 26,100	\$ 87,000
b. Fringe Benefits (tribe)	2,757	2,757	4,136	4,136	13,786
c. Travel (tribe)	800	1,000	3,600	3,600	9,000
d. Equipment (tribe)	1,200	1,200	2,650		5,050
e. Supplies (tribe)	600	600	2,000	8,800	12,000
f. Contractual	255,000	50,000	333,000	50,000	688,000
g. Construction		300,000			300,000
h. Other		150,000			150,000
i. Total Direct Charges (sum line a-h)	277,757	522,957	368,486	92,636	1,261,836
j. Indirect Charges	6,257	6,313	10,584	11,725	34,879
TOTALS (sum line i-j)	\$ 284,014	\$ 529,270	\$ 379,070	\$ 104,361	\$1,296,715

Gun Lake Tribe, Dorr, Michigan, January, 2004

¹ Excerpted from Standard Form 424A, OMB Circular A-102